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Date September 9, 2003  
To Examiner Anna M. Cromwell  
Of U.S. Patent and Trademark Office  
Fax (703) 872-9311  
From Frank L. Bernstein  
Subject Response Under 37 C.F.R. § 1.116  
Our Ref CA1117  
Pages 6  
(including cover sheet)

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In re application of  
Michael BARNES, et al.

Docket No: 005651 USA/ETCH/CHMBR/JB1  
(CA1117)

Appln. No.: 09/834,343

Group Art Unit: 1763

Confirmation No.: 2414

Filed: April 12, 2001

For: PLASMA REACTOR ELECTRODE

**DOCUMENTS ATTACHED:**

RESPONSE UNDER 37 C.F.R. § 1.116

**OFFICIAL**

RESPONSE UNDER 37 C.F.R. § 1.116  
EXPEDITED PROCEDURE  
GROUP 1763  
PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

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RESPONSE UNDER 37 C.F.R. § 1.116

MAIL STOP AF

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated June 11, 2003, for which the Examiner set a three-month period for response, Applicants submit the following remarks.

Applicants thank the Examiner for acknowledging approval of corrected Fig. 1.

Claims 1-10 and 14-16 are all the claims pending in the application.

Claims 1, 8-9, and 14 stand rejected under 35 U.S.C. 102(b) as being anticipated by Frankel et al. (U.S. 6,019,848). Claims 2-4, 6, and 16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel in view of Tomoyasu et al. (U.S. 5,888,907). Claims 5, 7, and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel in view of Hillman (U.S. 5,997,649). Claim 10 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel in view of Vukelic (U.S. 5,268,034). Applicants respectfully traverse these rejections,

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and request reconsideration and allowance of claims 1-10 and 14-16 in view of the following arguments.

Independent claims 1 and 14 of the present application recite a plasma reactor electrode comprising an upper plate and a lower plate for the transfer of RF energy, and a plurality of pins connecting the upper and lower plates to facilitate thermal conductivity during RF energy transfer.

The Examiner has asserted that Frankel teaches a plasma CVD apparatus, which is capable of transferring RF energy through both plates 20 and 301. The Examiner refers to Frankel, col. 13, lines 56-57; col. 23, line 52 to col. 24, line 9; col. 26, lines 30-35; and col. 28, lines 41-44. Applicants respectfully disagree.

The representative embodiment of Frankel is for a thermal CVD process (Frankel, col. 13, lines 47-50). The Examiner is correct that Frankel is not limited to a thermal CVD apparatus. However, Frankel's structure as used for thermal CVD processes cannot be the same as for a plasma CVD process. Frankel provides no suggestion of what that modification should be.

When used for a plasma CVD process, some of the components of the Frankel apparatus would have to be modified to accommodate RF energy (Frankel, col. 13, lines 64-67). Frankel does not describe these modifications in its specification and drawings directly. Instead, Frankel incorporates USP 4,872,947 to Wang by reference (Frankel, col. 26, lines 30-38). Therefore, the ordinarily skilled artisan would have to look to Wang.

Wang provides a reactor and methods for performing single and in-situ multiple integrated circuit processing steps. The objects of Wang are to prevent breakdown and

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premature deposition of process gas within a gas distribution system. As shown in its Fig. 2, Wang uses an anti-electrical breakdown gas feed-through box 36, which provides a constant voltage gradient along a process gas flow column indicated by arrows 131-135 without charge build-up (Wang, col. 17, lines 6-24). Wang also employs a RF powered gas manifold or box 26, whose radial pumping and high pressure capability provide confinement of the plasma species to a wafer, enables effective purging, and prevent deposition within the chamber except on the wafer (Wang, col. 17, lines 50-61).

The following modifications need to be made to the Frankel apparatus when it is used in a plasma process. First, a gas feed-through box described in Wang must be added to the Frankel apparatus to house gas passages 83 and 85 (Frankel, col. 26, lines 30-38). In addition, an isolator and a RF gas box must be added to the Frankel apparatus (Frankel, col. 28, lines 41-44). According to Frankel, a lid assembly for use with RF plasma process is described in Wang (Frankel, col. 28, lines 44-47). From the foregoing description in Frankel, a skilled artisan would appreciate that the Frankel apparatus employs the RF powered gas box 26 described in Wang, instead of the lid assembly 230 described in Frankel, as the powered RF electrode for a plasma process. Accordingly, the Frankel apparatus for a plasma process does not use plates 265, 301 or 20.

However, as Applicants have pointed out in the Response dated March 5, 2003, although Wang is directed to a plasma CVD process, Wang does not teach or suggest the recited upper and lower plates for RF energy transfer, connected by a plurality of pins.

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In short, Frankel is directed to a thermal CVD process, and does not teach or suggest an upper plate and a lower plate for RF energy transfer, nor pins between upper and lower plate facilitating thermal conductivity during RF energy transfer. Wang is directed to a plasma CVD process, but does not teach or suggest the upper and lower plate nor the pins. Thus, Frankel, incorporating Wang by reference, fails to teach or suggest features explicitly recited in independent claims 1 and 14 of the present invention. None of other references cited by the Examiner remedies Frankel's deficiencies.

Given the just-discussed structural differences, Applicants submit that the screws to which the Examiner points neither expressly nor inherently meet the requirement of the claimed pins.

Applicants therefore reassert that independent claims 1 and 14, and dependent claims 2-10 and 15-16 are patentable.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,

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Date: September 9, 2003



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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this Response Under 37 C.F.R. § 1.116 is being facsimile transmitted to the U.S. Patent and Trademark Office this 9<sup>th</sup> day of September, 2003

Signed: \_\_\_\_\_



Diana M. Schaller

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